AS138 – Tes River Basin

Geography

Total area TBA (km^2): 7500

No. countries sharing: 2

Countries sharing: Mongolia, Russia

Population: 9400

Climate Zone: Semi-arid

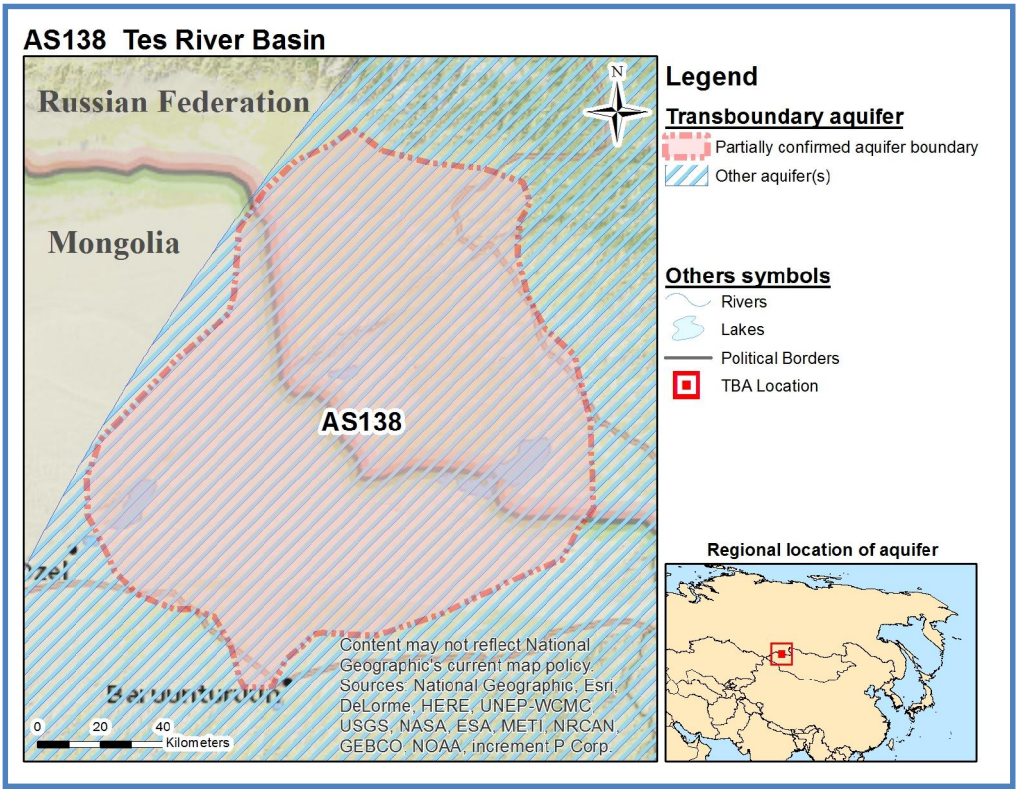
Rainfall (mm/yr): 260

Hydrogeology

Aquifer type: Multiple-layered hydraulically connected

Degree of confinement: Unconfined

Main Lithology: Sediment - sand



No cross-section available

Map and cross-section are only provided for illustrative purposes. Dimensions are only approximate

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TWAP Groundwater Indicators from Global Inventory

	Recharge (mm/y) (1)	Renewable groundwater per capita (m^3/y/capita)	Natural background groundwater quality (%) (2)	Human dependency on groundwater (%)	Groundwater depletion (mm/y)	Groundwater pollution (%) (3)	Population density (Persons/km2)	Groundwater development stress (%) (4)	Transboundary legal framework (Scores) (5)	Transboundary institutional framework (Scores) (6)
Mongolia	16	11 000	100	100	0		2	<5	B	D
Russian Federation							1			
TBA level										

(1) Recharge: This is the long term average recharge (in m^3/yr) divided by the surface area (m^2) of the complete country segment of the aquifer (i.e. not only the recharge area).
(2) Natural background groundwater quality: Estimate of percentage of surface area of aquifer where the natural groundwater quality satisfies local drinking water standards.
(3) Groundwater pollution: A. No pollution has been identified; B. Some pollution has been identified; Positive number: Significant pollution has been identified (% of surface area of aquifer).
(4) Groundwater development stress: Annual groundwater abstraction divided by recharge.
(5) Legal framework: A. Agreement with full scope for TBA management signed by all parties; B. Agreement with limited scope for TBA management signed by all parties; C. Agreement under preparation or available as an unsigned draft; D. No agreement exists, nor under preparation; E. Legal Framework differs between Aquifer States (see data at National level).
(6) Institutional Framework: A. Dedicated transboundary institution fully operational; B. Dedicated transboundary institution in place, but not fully operational; C. National/Domestic institution fully operational; D. National/Domestic institution in place, but not fully operational; E. No institution exists for TBA management; F. Institutional Framework differs between Aquifer States (see data at National level).
X A value was provided in the questionnaire, but it was considered un-realistic and therefore removed from the table.

Key parameters table from Global Inventory

	Distance from ground surface to groundwater table (m)	Depth to top of aquifer formation (m)	Full vertical thickness of the aquifer (system)* (m)	Degree of confinement	Predominant aquifer lithology	Predominant type of porosity (or voids)	Secondary Porosity	Transmissivity (m^2/d)
Mongolia	19	7	73	Whole aquifer unconfined	Sediment - Sand	Low primary porosity intergranular porosity	Secondary porosity: weathering	9
Russian Federation								
TBA level								

* Including aquitards/aquicludes
X A value was provided in the questionnaire, but it was considered un-realistic and therefore removed from the table.

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Aquifer description

As most of the information was provided by Mongolia, most of the values within this brief refer to the portion of the TBA within China.

Aquifer geometry

This aquifer is a multiple-layered hydraulically connected system and the entire aquifer is unconfined. The average depth to the water table is 19 m and the average depth to the top of the aquifer is 7 m. The average thickness of the aquifer system is 73m.

Hydrogeological aspects

The predominant aquifer lithology is sediment – sand that has a low primary intergranular porosity with secondary porosity: weathering. The formation is also characterised by a low horizontal and vertical connectivity. The average transmissivity value is low at 9 m^2/d. The total groundwater volume within the system is 0.41 km^3. The average recharge into the system is 62.7 Mm^3/yr and the aerial extent of the major recharge area is over 210 km^2. According to the long-term trend of the water levels the system shows no indications of groundwater depletion.

Linkages with other water systems

The predominant source of recharge is through precipitation over the aquifer area. The major discharge mechanism is through river base flow. Groundwater is feeding into the Tes River that recharges in Russia. Discharge through springs is also high at 26 Mm/yr.

Environmental aspects

The natural groundwater quality is suitable for human consumption and no groundwater quality issues have been recorded. Furthermore no anthropogenic groundwater pollution has been reported on. Within Mongolia around 18% of the aquifer is characterised by shallow groundwater whereas no groundwater dependent ecosystems within the area were reported on.

Socio-economic aspects

A total amount of 2.1 Mm^3 of water was abstracted from the system during 2010 within Mongolia and this represents the total water supply over the aquifer area.

Legal and Institutional aspects

According to Mongolia a Bilateral Agreement with limited scope for TBA management has been signed by all parties but no Transboundary Institute has been established. The National institution is in place, but is not fully operational.

Emerging Issues

The current status of the Bilateral Agreement should be reviewed and Transboundary cooperation should be promoted. Joint monitoring work by both countries should be encouraged.

Contributors to Global Inventory

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Sangam Shresta	Asian Institute of Technology	Thailand	sangamshrestha@gmail.com	Regional coordinator
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Considerations and recommendations

Most data in the tables and text above have been provided by national and regional experts (listed above) or have been derived from the global WaterGAP model. See colophon for more information, including references to data from other sources. One of the TBA countries contributed to the information. The information was adequate to describe the aquifer in general terms. Quantitative information was also available, and the indicators at the national level could also be calculated.

Data gaps and also differences between data from national experts (Global Inventory) and data derived from WaterGAP highlight the need for further research on transboundary aquifers.

Colophon

This Transboundary Aquifers information sheet has been produced as part of the Groundwater Component of the GEF Transboundary Water Assessment Programme (GEF TWAP). **GEF TWAP** is the first truly global comparative assessment of transboundary groundwater, lakes, rivers, large marine ecosystems and the open ocean. More information on TWAP can be found on: www.geftwap.org . **The Groundwater component** of TWAP carried out a global comparison of 199 transboundary aquifers and the groundwater systems of 41 Small Island Developing States. The data used to compile this transboundary aquifer information sheet has been made available by national and regional experts from countries involved in the TWAP Groundwater project. For aquifers larger than 20 000 km2 and which are not overlapping, additional data are available from modelling done by the Goethe University Frankfurt (Germany) as part of TWAP Groundwater. All data were compiled by UNESCO-IHP and the International Groundwater Resources Assessment Centre (IGRAC – UNESCO Category II Institute). Values given in the fact-sheet represent an approximate guide only and should not replace data obtained from recent local assessments. The editors of this information sheet are not responsible for the quality of the data.
For more information on TWAP Groundwater and for more data, please have a look at the TWAP Groundwater Information Management System which is accessible via www.twap.isarm.org or www.un-igrac.org.

Request:
If you have additional data or information about this transboundary aquifer that can improve the quality of this information sheet and the underlying database, please contact us via email at info@un-igrac.org. If appropriate, the information will be uploaded to the database of transboundary aquifers and will also be used in new versions of this information sheet.

References:

- Population: Population has been calculated based on the aquifer map and grid information on population. Source population data: Center for International Earth Science Information Network - CIESIN - Columbia University, United Nations Food and Agriculture Programme - FAO, and Centro Internacional de Agricultura Tropical - CIAT. 2005. Gridded Population of the World, Version 3 (GPWv3): Population Count Grid, Future Estimates. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). http://dx.doi.org/10.7927/H42B8VZZ. Accessed Jan 2015.
- Rainfall: Average rainfall per TBA has been calculated based on the aquifer map and grid data for precipitation. Source precipitation data: Hijmans, R.J., S.E. Cameron, J.L. Parra, P.G. Jones and A. Jarvis, 2005. Very high resolution interpolated climate surfaces for global land areas. International Journal of Climatology 25: 1965-1978. Grid data download from www.worldclim.org (2015): Data for current conditions (~1950-2000), ESRI grids, 30 arc seconds, Precipitation.
- Climate: Climate indicates the major climate zone which occurs in the aquifer area. If more than 1 climate zone is present the zone with the largest surface area was selected. Source climate data: ArcGIS Online (2015), Simplified World Climate zones. Owner: Mapping Our World GIS Education. Original map: National Geographic World Atlas for Young Explorers (1998).
- All other data: TWAP Groundwater (2015).

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